सत्यमेव जयते

Ministry of Electronics & Information Technology (MeitY)
Government of India

ELECTRONICS INDIA
Billion Needs Million Chips

Government of India Initiative for Employability Enhancement

- Faculty Training
- Training and Consultancy
- Services for Industry
- Technical Incubation and Entrepreneurship
- Continuing Education for Students & Professionals

Digital India
Power To Empower

IIT Guwahati | IIITDM Jabalpur | MNIT Jaipur | NIT Patna | IIT Roorkee | NIT Warangal

India is fast emerging as a world power in Information, Communications Technology and Electronics (ICTE) sectors. To complement its growth and further development, there is an ever-increasing need for trained professionals with specialization in this space. This includes training of professionals not only in existing and changing technologies but also in the fields of R&D and electronics manufacturing. This will specifically be aimed at the ICTE sector to create a substantial resource pool of talent and generate ample opportunities for entrepreneurs.

Ministry of Electronics & Information Technology (MeitY) has approved a scheme and set up Electronics and ICT Academies at 07 (seven) institutions viz. IIT Guwahati, IIT Kanpur, NIT Warangal, NIT Patna and IIITDM Jabalpur (all five under Category-A); and IIT Roorkee, MNIT Jaipur (both under Category B). The Ministry had earlier setup two ICT Academies at Tamil Nadu and Kerala respectively. Estimated cost and targets for the Electronics and ICT Academy in the two Categories for a period of four years are as under:

Category	Total Outlay	Internal Revenue Generation	Grants-in-Aid from Central Government	Training Target (Faculty members)
Category-A	Rs. 25 crore	Rs. 7.50 crore	Rs. 17.50 crore	16,000
Category-B	Rs. 10 crore	Rs. 3.00 crore	Rs. 7.00 crore	6,400

These Academies are aimed at faculty/mentor development and upgradation to improve the employability of the graduates, diploma holders in various streams, through collaboration of States/Union Territories. Each Academy is being provided funding support for four years and is expected to generate revenue by charging fee and taking up other activities to meet the recurring cost in a gradual manner and become self-sustainable by the end of fourth year onwards. All these Academies will cater to the requirements of identified neighbouring States and UTs also. Brief information about all the Academies is available at : http://Meity.gov.in/content/scheme-financial-assistance-setting-electronics-andict-academies

Activities of the Academies

- Faculty development for
  - — Specialized training with hands-on on basic and advanced level topics for Engineering streams and
  - — Domain based training on use of ICT tools and techniques for non-engineering streams
- Training and consultancy services for industry
- Curriculum development for Industry
- Continuing Education programme for students / working professionals
- Design, Develop and Deliver specialized modules for specific research areas
- Providing advice and support for technical incubation and entrepreneurial activities

About Summer Courses

Faculty Development Programmes in core areas of Electronics and Information & Communication Technology (ICT) streams have been planned by academies for delivery during Summer (i.e., May - July 2017). All these summer courses will be offered through National Knowledge Network (NKN) by inviting experts from IITs, NITs, IIITs and other premier institutes/industries. In addition, local course coordinators at respective academies will take care of practicals and practice sessions. The following six courses would be taken up for delivery during forthcoming summer vacation:

S.No.	Course Name	Key Coordinating Academy	Proposed Dates From	To
1.	Fundamentals of Analog and Digital Communication System	IIT Guwahati	13-5-2017	22-5-2017
2.	Fundamentals of Computer Networks and Security	NIT Patna	24-5-2017	02-6-2017
3.	Digital VLSI Circuit Design	IIT Roorkee	03-6-2017	12-6-2017
4.	Introduction to Web Development	IIT Roorkee	13-6-2017	22-6-2017
5.	Fundamentals of Databases	NIT Warangal	23-6-2017	03-7-2017
6.	Introduction to Data Structures and Programming in C	IIITDM Jabalpur	01-7-2017	10-7-2017

Target Beneficiaries: Interested Faculty of engineering/technical institutions are eligible to attend these summer courses.

Availability of seats at each offering Academy: Fifty (50) seats are available for each summer course to be offered at each academy. Participants will be selected based on first-cum-first-serve basis by each academy. Ten (10) more seats are also available for participants from industry. Selected participants will be communicated through e-mail / notified in E&ICT Academy websites.

Course duration: Each summer course is designed for 80 hours (Theory Lectures: 35 hours, Practicals: 35 hours, and Pedagogy, Soft skills & Demo teaching/Case study presentation by participants: 10 hours)

Accommodation: Boarding and Lodging will be provided at free of cost. No Travel Allowance will be paid to the participants.

Registration Fee for each Summer Course:

Faculty members: **Rs. 3,000/- (Three Thousand rupees only)**
Persons from Industry: **Rs. 9,000/- (Nine Thousand rupees only)**

Mode of Payment:

Academy Name	Participants belonging to States/ UTs	Payment through DD / Online transfer
NIT Warangal	Telangana, Andhra Pradesh, Karnataka, Goa, Andaman and Nicobar Islands, Puducherry	Demand Draft in favor of **"Director, NIT Warangal"** payable at NIT Warangal or ***On-line Mode:*** Account Name: Electronics & ICT Academy NITW Account No: 62423775910 and IFSC: SBHY0020149
IIT Guwahati	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim	Demand Draft in favor of **"Registrar, IIT Guwahati"** Payable at Guwahati or ***On-line Mode:*** Account Name: IIT Guwahati R&D E&ICT ACADEMY Account No. 36071160089 and IFSC: SBIN0014262
IIITDM Jabalpur	Madhya Pradesh, Chhattisgarh, and Maharashtra	Demand Draft in favor of **"Electronics and ICT Academy, IIITDMJ"** payable at Jabalpur or ***On-line Mode:*** Account Name: Electronics and ICT Academy, IIITDMJ, Jabalpur Account No. 50302042708 and IFSC: ALLA0212433
MNIT Jaipur	Rajasthan, Gujarat, Dadra & Nagar Haveli, and Daman & Diu	Demand draft in favor of **"Electronics and ICT Academy, MNIT Jaipur"** Payable at Jaipur or ***Online Mode:*** Account Name: Electronics & ICT Academy, MNIT, Jaipur Account No: 676801700483, IFSC: ICIC0006768

Academy Name	Participants belonging to States/ UTs	Payment through DD / Online transfer
NIT Patna	Bihar, Jharkhand, Odisha, and West Bengal	Demand draft in favor of **"Director, NIT Patna"** payable at Patna or ***On-line Mode:*** Account Name: NIT, Patna Account No: 50323610510, IFSC: ALLA0212286
IIT Roorkee	Jammu and Kashmir, Himachal Pradesh, and Uttarakhand	Demand draft in favor of **"Dean SRIC IIT Roorkee"** payable at Roorkee or ***On-line Mode:*** Account Name: Research Project, IIT Roorkee Account No: 33012172097, IFSC: SBIN0001069

Note: Participants belonging to a state other than the states mentioned above can apply to any of one the nearest academies as per their choice.

How to apply:

* A duly filled-in application form in the prescribed format duly signed and sponsored by the Head of the Institute to which candidate belongs (along with demand draft / wire transfer details) should reach by post to the local coordinator of the participating academy.
* Government of India norms will be followed for SC/ST category participants.
* The application form along with the Registration fee can also be submitted in the online mode to Local Coordinator of the respective academy.

Note: Refer offering Academies websites for complete postal address and other details of summer courses.

Last Date for Submission of Applications and Intimation of Selection:

	Fundamentals of Analog and Digital Communications (13-22, May 2017)	Fundamentals of Computer Networks and Security (24th May - 2nd June 2017)	Digital VLSI Circuit Design (3-12, June 2017)	Introduction to Web Development (13-22, June 2017)	Fundamentals of Databases 23rd June - 3rd July 2017)	Introduction to Data Structures and Programming in C (1-10, July 2017)
Last Date for Submission of application form	**April 29, 2017**	**May 10, 2017**	**May 20, 2017**	**May 30, 2017**	**June 9, 2017**	**June 17, 2017**
Selection list Intimation by E-mail/Display in web site	**May 6, 2017**	**May 17, 2017**	**May 27, 2017**	**June 6, 2017**	**June 16, 2017**	**June 24, 2017**

The following are the details of summer courses being offered during May - July 2017:

Course 1: Fundamentals of Analog and Digital Communication System

(Offered during 13th - 22nd May, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
IIT Guwahati - Prof. Ratnajit Bhattacharjee ratnajit@iitg.ernet.in	IIT, Guwahati - ***Prof. Ratnajit Bhattacharjee*** ratnajit@iitg.ernet.in
	MNIT Jaipur - ***Dr. Satyasai J. Nanda*** - sjnanda.ece@mnit.ac.in
	NIT Patna - ***Dr. Seemanti Saha*** - seemanti@nitp.ac.in
	IIT Roorkee - ***Dr. S. Chakroborty*** - scecefec@iitr.ac.in
	NIT Warangal - ***Dr. V. V. Mani*** - vvmani@nitw.ac.in

Module details of Fundamentals of Analog and Digital Communication System:

S.No.	Module Name	Topics
1.	**Review of Fundamental Concepts and Mathematical preliminaries**	Elements of an electrical communication system; Characteristics of communication channel and their mathematical modeling; Signal models: deterministic and random; signal classification; Convolution Integral and response of LTI system; Fourier series representation, Parseval's theorem; Fourier transform; Hilbert transform; Random Process: mean, correlation and covariance; stationary and ergodic processes; power spectral density; Gaussian Process.
2.	**Analog Communication Systems**	Concept of modulation and demodulation, Continuous wave (CW) modulation: amplitude modulation (AM) - double sideband (DSB); double sideband suppressed carrier (DSBSC); single sideband suppressed carrier (SSBSC) and vestigial sideband (VSB) modulation, angle modulation - phase modulation (PM) & frequency modulation (FM); narrow and wideband FM. Representation of narrowband noise; receiver model, signal to noise ratio (SNR), noise figure, noise temperature, noise in DSB-SC, SSB, AM & FM receivers, pre-emphasis and de-emphasis.
3.	**Pulse Modulation**	Sampling process, sampling theorem for band limited signals; pulse amplitude modulation (PAM); pulse width modulation (PWM); pulse position modulation (PPM); pulse code modulation (PCM); line coding; differential pulse code modulation; delta modulation and adaptive delta modulation, Basics of time division multiplexing, noise consideration in PAM and PCM systems.
4.	**Basic digital modulation schemes and signaling over AWGN channels**	Overview of geometric representation of signals, Gram-Schmidt Orthogonali-zation procedure; Basic digital modulations schemes: Phase shift keying (PSK), amplitude shift keying (ASK), frequency shift keying (FSK) and Quadrature amplitude modulation (QAM); coherent demodulation and detection; probability of error. Basics of equivalent complex baseband representation of digitally modulated signals.
5.	**Hands on (circuit design, assembly and measurements)**	Amplitude modulation and demodulation (AM with carrier & DSBSC AM); frequency modulation and demodulation (using VCO & PLL); automatic gain control (AGC); pulse width modulation (PWM); pulse code modulation (PCM); pseudo-random (PN) sequence generation; Generation and detection of signals for binary phase shift keying (BPSK) and binary frequency shift keying (BFSK). BER performance of BPSK signals.
6.	Pedagogy, Soft Skills & Demo Teaching by Participants	

Course 2: Fundamentals of Computer Networks and Security

(Offered during 24th May - 2nd June, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
NIT Patna - Prof. M. P. Singh mps@nitp.ac.in	NIT Patna - ***Dr. Ditipriya Sinha*** - ditipriya.cse@nitp.ac.in
	IIT Guwahati - ***Dr. Santosh Biswas*** - santosh_biswas@iitg.ernet.in
	IIITDM Jabalpur - ***Dr. Ruchir Gupta / Dr. V.K. Jain*** rgupta@iiitdmj.ac.in / vkjain@iiitdmj.ac.in
	MNIT Jaipur - ***Dr. Emmanuel S. Pilli*** - espilli.cse@mnit.ac.in
	IIT Roorkee - ***Dr. Sateesh K Peddoju*** - drpskfec@iitr.ac.in

Module details of Fundamentals of Computer Network and Security:

S.No.	Module Name	Topics
1.	**Introduction**	Introduction to Data Communication, Protocols and Standards: Protocols, Standards, Standards Organizations, Internet Standards, Packet Switching, Circuit Switching, A Network of Networks; Understanding of Delay, Loss and Throughput in the packet-switched networks; Protocols layers and their service model: OSI, TCP/IP, X.25; TCP/IP vs OSI
2.	**Principles of Network Applications**	Principles of Network Applications; The Web and HTTP; File Transfer: FTP; Electronic Mail in the Internet: SMTP; DNS -The Internet's Directory Service; Peer-to-Peer Applications
3.	**Overview of Layers**	TCP/IP and OSI Model, Protocol Layers: Hierarchy, Services
4.	**Link Layers**	Introduction and Services; Error-Detection and Correction Techniques; Multiple Access Links and Protocols, Link-Layer Addressing & ARP, Ethernet, Link-Layer Switches,PPP
5.	**Addressing at layers**	Physical Addresses, Logical Addresses, Port Addresses, Specific Addresses
6.	**Introduction of transport layer**	Introduction and Transport-Layer Services, Relationship Between Transport and Network Layers, Overview of the Transport Layer in the Internet, Multiplexing and Demultiplexing
7.	**Connectionless Transport**	UDP, UDP Segment Structure, UDP Checksum, Principles of Reliable Data Transfer, Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Go-Back-N, Selective Repeat, Hybrid
8.	**Connection-Oriented Transport**	TCP, TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Timeout, Reliable Data Transfer, Flow Control, TCP Connection Management
9.	**Principles of Congestion Control**	Causes and the Costs of Congestion, Approaches to Congestion Control, Network-Assisted Congestion-Control Example: ATM ABR Congestion Control, TCP and UDP Fairness
10.	**The Internet Protocol (IP)**	Forwarding and Routing, Network Service Models, Virtual Circuit and Datagram Networks, Virtual-Circuit Networks, Datagram Networks, What's Inside a Router?, Generation of routers, Input Processing, Switching, Output Processing, Where Does Queuing Occur? Forwarding and addressing in the Internet, Datagram Format, IPv4 Addressing (classful and classless), IPv4 vs IPv6, Subnetting, Supernetting, masking
11.	**Routing Algorithms**	The Link-State (LS) Routing Algorithm, The Distance-Vector (DV) Routing Algorithm, Hierarchical Routing, Routing in the Internet, Intra-AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter-AS Routing: BGP, Broadcast and Multicast Routing, Broadcast Routing Algorithms, Multicast, Internet Control Message Protocol (ICMP), IGMP, ARP, RARP
12.	**Security at Layers**	Security Services: Introduction of Message Confidentiality, Message Integrity, Message Authentication, Message Nonrepudiation, Security threats, Entity Authentication **Network Layer Security: IP Security (lPSec):** Two Modes, Two Security Protocols, Security Association, Internet Key Exchange(IKE), Virtual Private Network. **Transport Layer Security:** SSL Services and Security Parameters, Sessions and Connections, Four Protocols. **Application Layer Security:** Email Security, S/MIME, PGP: Security Parameters, Services, PGP Algorithms, PGP Certificates, Proxy Server Firewall.
13.	Pedagogy, Soft Skills & Demo Teaching by Participants	

Course 3: Digital VLSI Circuit Design

(offered during 3rd - 12th June, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
IIT Roorkee - **Dr. Sanjeev Manhas** smanhas333@gmail.com	IIT Roorkee - ***Dr. Bishnu Das*** - bpdasfec@iitr.ac.in
	IIT Guwahati - ***Dr. Gaurav Trivedi*** - trivedi@iitg.ernet.in
	MNIT Jaipur - ***Dr. C. Peraswamy*** - cpsamy.ece@mnit.ac.in
	IIITDM Jabalpur - ***Prof. P.N. Kondekar*** - pnkondekar@iiitdmj.ac.in
	NIT Patna - ***Dr. Gaurav Kaushal*** - kaushalg@nitp.ac.in
	NIT Warangal - ***Dr. P. Srihari Rao*** - patri@nitw.ac.in

Module details of Digital VLSI Circuit Design:

S.No.	Module Name	Topics
1.	**Fundamental Concepts**	**CMOS device/interconnect fundamentals:** Basic MOS models, MOSFET I-V characteristics, MOSFET capacitances, parasitic resistances, introduction to SPICE level, lumped and distributed RC model for interconnects, CMOS process flow, Layout and design rules. **CMOS inverter:** Static characteristics, power consumption, dynamic behaviour, power consumption.
2.	**Design of Basic Building Blocks**	**Combinational logic:** Transistor sizing in static CMOS logic gates, dynamic logic, pass-transistor logic, power consumption of combinational circuits. **Sequential Circuit Elements:** Static latches and flip-flops (FFs), dynamic latches and FFs, Schmitt trigger, monostable and astable circuits, power consumption of sequential circuits.
3.	**Concepts for Analysis and Design**	**Method of Logical Effort:** Logical Effort delay model, buffer design using the method of logical effort, static MOS logic gate sizing considering method of logical effort, Stage sizing in combinational multi-stage circuits. **Timing and Power:** Timing fundamentals, clock distribution, jitter, self-timed circuit design, synchronizers and arbiters, basic building blocks of PLLs, clock synthesis and synchronization using PLLs, power consumption in CMOS multi-stage.
4.	**Multi-Stage Circuits and Subsystems**	**CMOS Memories and Array Structures:** MOS-ROM, SRAM cell, memory peripheral circuits, signal to noise ratio, power dissipation. **Digital CMOS Circuits:** Decoders, Multiplexers, data path and control paths, power consumption in data paths.
5.	Pedagogy, Soft Skills & Demo Teaching by Participants	

Course 4: Introduction to Web Development

(Offered during 13th - 22nd June, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
IIT Roorkee - **Dr. Sanjeev Manhas** smanhas333@gmail.com	IIT Roorkee - ***Dr. Sudip Roy*** - sudiproy.fcs@iitr.ac.in
	IIT Guwahati - ***Prof. Rohit Sinha*** - rsinha@iitg.ernet.in
	IIITDM Jabalpur - ***Dr. Atul Gupta*** - atul@iiitdmj.ac.in
	MNIT Jaipur - ***Dr. S. J. Nanda*** - sjnanda.ece@mnit.ac.in
	NIT Patna - ***Prof. Anand Sankar Tiwari*** - anand@nitp.ac.in
	NIT Warangal - ***Dr. T. Ramakrishnanudu*** - trk@nitw.ac.in

Module details of Introduction to Web Development:

S.No.	Module Name	Topics
1.	**Overview of Web Development - Client-side Programming**	**Introduction to Web Page Designing:** History of Web and Internet, Protocols governing Web, Introduction to Internet services and tools, Introduction to client-server computing. What is HTML? HTML Documents, Basic structure of an HTML document, Creating an HTML document, Markup Tags, Heading-Paragraphs, list, table, images, frames, forms, CSS, Document type definition, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts). Creating and Saving the Web Site, Creating web site structure and titles for web pages, Themes-Publishing web sites. **XML:** DTD, XML schemes, Object Models, Presenting and using XML, Using XML Processors like DOM and SAX, Dynamic HTML.
2.	**Scripting**	**Java script:** Introduction, JavaScript Basics, Variables, Arrays and Operators, Event Handlers, Built-In JavaScript Objects, JavaScript Form Validation Conditionals and Loops, Debugging and Testing with Chrome. **Introduction to AJAX:** Intro to Ajax and the Node.js Server, Ajax Basics-The XMLHttpRequest Object, Using an XMLHttpRequest Object, Handling the Response, jQuery, Passing Data, Ajax Applications, CORS/JSONP.
3.	**Server-side Programming**	**Server-side Programming:** Introduction to active server pages (ASP), Introduction to Java Server Page (JSP), JSP Application Design, JSP objects, Conditional Processing, Declaring variables and methods, sharing data between JSP pages. **PHP (Hypertext Preprocessor):** Introduction, syntax, variables, strings, operators, if-else, loop, switch, array, function, form, mail, file upload, session, error, exception, filter, PHP-ODBC, Text. Introduction to web Server and Installation of XAMPP server.
4.	**Introduction to MySQL**	**Introduction to MySQL:** Designing Databases, MySQL Functions, Database Structures, Doing Advanced Queries, Advanced MySQL Concepts, Managing Users and Privileges, Backing Up and Restoring MySQL Databases, MySQL Options File and Configuring and Tuning the MySQL Server.
5.	Pedagogy, Soft Skills & Demo Teaching by Participants	

Course 5: Fundamentals of Databases

(Offered during 23rd June - 3rd July, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
NIT Warangal - **Dr. R. B. V. Subramanyam** rbvs66@gmail.com	NIT Warangal - ***Dr. R.B.V. Subramanyam*** - rbvs66@gmail.com
	IIT Guwahati - ***Dr. Santosh Biswas*** - santosh_biswas@iitg.ernet.in
	IIITDM Jabalpur - ***Dr. Pritee Khanna*** - pkhanna@iiitdmj.ac.in
	MNIT Jaipur - ***Dr. Dinesh Gopalani*** - dgopalani@gmail.com
	NIT Patna - ***Dr. Md. Tanwir Uddin Haider*** - tanwir@nitp.ac.in
	IIT Roorkee - ***Dr. Biplab Banerjee*** - getbiplab@iitr.ac.in

Module details of Fundamentals of Databases:

S.No.	Module Name	Topics
1.	**Introduction**	Introduction to Database Systems; Levels of abstraction, Three layer architecture. Data Independence. Schema, Structure of DBMS. Data Models - Relational Data Model and comparison with other data models
2.	**Entity Relationship Modelling**	E-R Model: Entities, Attributes, Entity sets, Relationships, Key constraints, Participation constraints, Weak entities, Conceptual Database Design with ER model. Schema conversion from E-R to Relational Data Model
3.	**Relational Algebra**	Relational Algebra: Introduction to Relational algebra, Basis relational operators, Query expressions using operators, Query writing using sample database.
4.	**Relational Calculus**	Tuple relational calculus, Domain relational calculus, Basics of QUEL and Query By Example (QBE), Safe domain relational calculus, Query writing using sample database.
5.	**SQL - Part I**	Basic SQL query. Basic SQL operators, Nested Queries, Aggregate Operators, Embedded SQL, Cursors, Dynamic SQL, ODBC and JDBC, Triggers.
6.	**SQL Part - II**	Evaluation of Relational Operators, Query Processing, The Selection Operation, Projection Operation, Join Operation, Set Operations, Aggregate Operations.
7.	**Database Design Process**	Schema Refinement, Problems caused by Redundancy, Functional Dependencies, Multi-valued and join Dependencies, Normal Forms, Normalization
8.	**Transaction Processing**	Concept of Transaction, Transactions and Schedules, Concurrent execution of transactions, Serializability, 2PL, Lock Management, Optimistic Concurrency Control, Timestamp-based Concurrency Control. Crash Recovery, ARIES, Recovering from a System Crash.
9.	**Database Administration (Industry)**	Functions of Database Administration, Roles, managing data security, back up databases, controlling concurrent access, data quality management, tuning of database performance
10.	Pedagogy, Soft Skills & Demo Teaching by Participants	

Course 6: Introduction to Data Structures and Programming in C

(Offered during 1st - 10th July, 2017)

Key Coordinating Academy & Global Coordinator	Participating Academies and Local Coordinator Details
IIITDM Jabalpur - Prof. Aparajita Ojha academyiiitdmj@gmail.com	IIITDM Jabalpur - ***Prof.Aparajita Ojha*** - academyiiitdmj@gmail.com
	IIT Guwahati - ***Dr. Santosh Biswas*** - santosh_biswas@iitg.ernet.in
	MNIT Jaipur - ***Dr. Emmanual S.Pilli*** - espilli.cse@mnit.ac.in
	NIT Patna - ***Dr. Prabhat Kumar*** - prabhat@nitp.ac.in
	IIT Roorkee - ***Dr. Sudip Roy*** - sudiproy.fcs@iitr.ac.in
	NIT Warangal - ***Dr. R. R. Rout*** - rashrr@nitw.ac.in

Module details of Introduction to Data Structures and Programming in C:

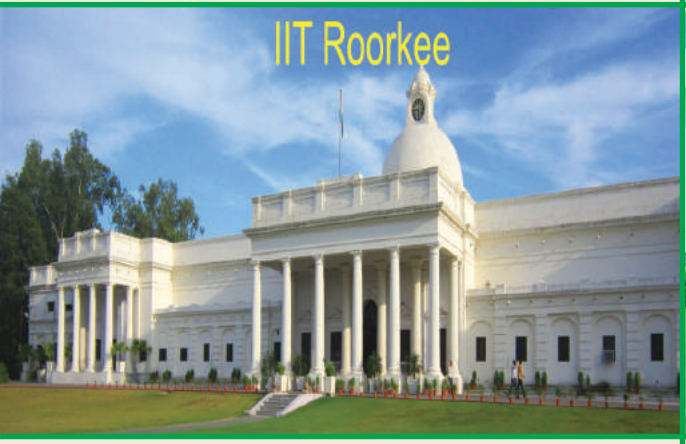
S.No.	Module Name	Topics
1.	**Fundamental Concepts of Programming**	Introduction to digital computers, Revision of C language fundamentals with some tricky examples and implementations. Dynamic memory allocation, pointers, structures, unions, pointer and array, pointer to pointer, pointer to structure, pointers and functions, Header files and libraries, writing and using Makefile Programming will be in Linux environment where program editors like vim and emacs along with compilers like gcc, g++ will be used. gdb, valgrind will be used to demonstrate program debugging
2.	**Data Structures and Implementation of Algorithms**	Basics of algorithm design techniques, time and space complexity analysis, asymptotic notations, recursion verses iteration Linear and non-linear data structures, arrays, sparse matrices, linked list Sorting and searching algorithms: insertion sort, selection sort, quicksort, merge sort, counting sort, sequential and binary search
3.	**Basic Concepts of Data Structures**	Basic data structures: stack, queue, binary search trees, tree traversals, balanced search trees: AVL tree, application of binary tree, Heap and priority queue, Heap sort Strings, common functions in string
4.	**Abstract Data Types, Hashing and File Structures**	Sets, sequences, maps, union-find, graph, digraph, Graph traversals, Shortest path, n-ary trees, B-trees, B+ trees, splay trees Hashing, hashing functions, hash tables, collision resolution techniques, separate chaining, open addressing, rehashing, extensible hash tables, directory structures, hash tables in the standard library File structures, sequential and direct access, relative files, indexed files, B+ tree as index, multi-indexed files, inverted files, hashed files
5.	Pedagogy, Soft skills & Demo Teaching by Participants	


NIT
WARANGAL


IIT Guwahati


PDPM IIITDM Jabalpur


NIT Patna


IIT Roorkee


MNIT Jaipur
MNIT

Contact us

Academy Name	States to Which Catering	Chair/Chief Coordinator	Contact Details
Electronics & ICT Academy at NIT Warangal	Telangana, Andhra Pradesh, Karnataka, Puducherry, Andaman and Nicobar Islands, Goa	***Prof. D.V.L.N. Somayajulu***	Email: soma@nitw.ac.in eict.nitw@gmail.com M: 09849336547 Website: http://nitw.ac.in/eict/
Electronics & ICT Academy at IIT Guwahati	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura,Sikkim	***Prof. Ratnajit Bhattacharjee***	Email:ratnajit@iitg.ernet.in M: 09954498116 Website: https:// www.iitg.ernet.in/eictacad/
Electronics & ICT Academy at IIITDM Jabalpur	Madhya Pradesh, Chhattisgarh, Maharashtra	***Prof. Aparajita Ojha***	Email: aojha@iiitdmj.ac.in M: +919425800334 Website: http://ict.iiitdmj.ac.in/
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